# TEST REPORT
# FROM
# RFI GLOBAL SERVICES LTD

Test of: SoftBank 832P

To: FCC Part 15.225: 2008 Subpart C

**Test Report Serial No:**
RFI/RPT2/RP74674JD05A
**Supersedes Test Report Serial No:**
RFI/RPT1/RP74674JD05A

| | |
|---|---|
| **This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:**  | |
| **Checked By:**  | **Report Copy No: PDF01** |
| **Issue Date: 12 March 2009** | **Test Dates: 10 February to 13 February 2009** |

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## 1. Customer Information

| | |
|---|---|
| **Company Name:** | Panasonic Mobile Comms Dev of Europe Ltd |
| **Address:** | Panasonic House<br>Willoughby Road<br>Bracknell<br>Berkshire<br>RG12 8FP |

# 2. Equipment Under Test (EUT)

## 2.1. Identification of Equipment Under Test (EUT)

| | |
|---|---|
| **Brand Name:** | SoftBank 832P |
| **Model Name or Number:** | EB-VS86JZA |
| **Hardware Version:** | Rev B |
| **Software Version:** | 832PVA04 |
| **IMEI Number:** | 004401220707604 |
| **FCC ID Number:** | UCE209016A |

| | |
|---|---|
| **Description:** | 128 MB Micro-SD Memory Card |
| **Brand Name:** | Not stated |
| **Model Name or Number:** | Not stated |

| | |
|---|---|
| **Description:** | AC Charger |
| **Brand Name:** | Softbank |
| **Model Name or Number:** | ZTDAA1 |

| | |
|---|---|
| **Description:** | DC Charger |
| **Brand Name:** | SoftBank |
| **Model Name or Number:** | PMJAA1 |

| | |
|---|---|
| **Description:** | Personal Hands-Free |
| **Brand Name:** | SoftBank |
| **Model Name or Number:** | ZTCK01 |

| | |
|---|---|
| **Description:** | Personal Hands-Free Converter |
| **Brand Name:** | SoftBank |
| **Model Name or Number:** | PMLAJ1 |

| | |
|---|---|
| **Description:** | USB Data cable |
| **Brand Name:** | SoftBank |
| **Model Name or Number:** | ZTFE01 |

### 2.2. Description of EUT

The equipment under test was a dual mode (W-CDMA FDDI/GSM900/1800/1900MHz) cellular mobile telephone with RFID.

### 2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

## 2.4. Support Equipment

The following support equipment was used to exercise the EUT during testing:

| | |
|---|---|
| **Description:** | Dummy battery |
| **Model Name or Number:** | Not stated |
| **Serial Number:** | Not stated |

| | |
|---|---|
| **Description:** | Laptop PC |
| **Brand Name:** | Panasonic |
| **Model Name or Number:** | CF-W2 |
| **Serial Number:** | Not stated |

## 2.5. Additional Information Related to Testing

| | | |
|---|---|---|
| **Tested Technology:** | RFID | |
| **Channel Spacing:** | Single channel device | |
| **Transmit Frequency:** | 13.56 MHz | |
| **Receive Frequency:** | 13.56 MHz | |
| **Power Supply Requirement (DC):** | Nominal (V) | 3.7 |
| | Minimum (V) | 3.4 |
| | Maximum (V) | 4.2 |
| **Tested Temperature Range (°C):** | Minimum | -20 |
| | Maximum | +50 |

# 3. Test Specification, Methods and Procedures

## 3.1. Test Specifications

| | |
|---|---|
| **Reference:** | FCC Part 15.225: 2008 Subpart C |
| **Title:** | Code of Federal Regulations, (47CFR15)<br>Radio Frequency Devices. |

| | |
|---|---|
| **Reference:** | FCC Part 15.107 and 15.109: 2008 Subpart B |
| **Title:** | Code of Federal Regulations, (47CFR15)<br>Radio Frequency Devices. |

## 3.2. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI C63.2 (1987)
Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2001)
Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)
Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)
Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)
Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

## 3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the Methods & Procedures section above. Appendix 1 contains a list of the test equipment used.

## 4. Deviations from the Test Specification

There were no deviations from the test specification.

# 5. Operation of the EUT During Testing

## 5.1. Operating Modes

The EUT was tested in the following operating modes:

- Receiver/Idle mode
- Constantly transmitting at full power with a modulated carrier

## 5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

- The RFID transmitter was enabled using a bespoke application on a laptop PC supplied by the customer.
- The Micro SD card was installed during all tests.
- Radiated spurious emissions tests were performed with the Portable Hands Free connected to the EUT as this was found to be the worst case during pre-scans. All accessories were individually connected and measurements made during pre-scans to determine the worst case combination.
- As the EUT is not capable of transmitting while charging, no AC Mains Conducted Emissions (150 kHz to 30 MHz) test was performed in transmit mode.
- The dummy battery was fitted during frequency measurement tests. This was connected to a bench power supply and the DC voltage level adjusted and monitored accordingly.

# 6. Summary of Test Results

| Range of Measurements | Standard Reference | Port Type | Result |
|---|---|---|---|
| Receiver/Idle Mode AC Conducted Emissions | FCC Part 15: Section 15.107(a) | AC Mains | Complied |
| Receiver/Idle Radiated Spurious Emissions | FCC Part 15: Section 15.109 (a), 15.225(d) | Enclosure | Complied |
| Transmitter Fundamental Field Strength | FCC Part 15: Section 15.225(a)(b)(c)(d) | Antenna | Complied |
| Transmitter Radiated Spurious Emissions | FCC Part 15: Section 15.209(a), 15.225(d) | Enclosure | Complied |
| Transmitter Band Edge Radiated Emissions | FCC Part 15: Section 15.209(a) 15.225(c)(d) | Antenna | Complied |
| Transmitter 20 dB Bandwidth | FCC Part 2: Section 2.1049 | Antenna | Complied |
| Transmitter Frequency Stability (Temperature & Voltage Variation) | FCC Part 15: Section 15.225(e) | Antenna | Complied |

## 6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.

## 6.2. Site Registration Numbers

FCC: 209735

# 7. Measurements, Examinations and Derived Results

## 7.1. General Comments

7.1.1. This section contains test results only.

7.1.2. Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%.
Please refer to Section 8 for details of measurement uncertainties.

## 7.2. Test Results

### 7.3. Receiver/Idle Mode AC Conducted Spurious Emissions

### Test Summary:

| | |
|---|---|
| **FCC Part:** | 15.107(a) |
| **Test Method Used:** | As detailed in ANSI C63.4 Section 7 and relevant annexes |

### Environmental Conditions:

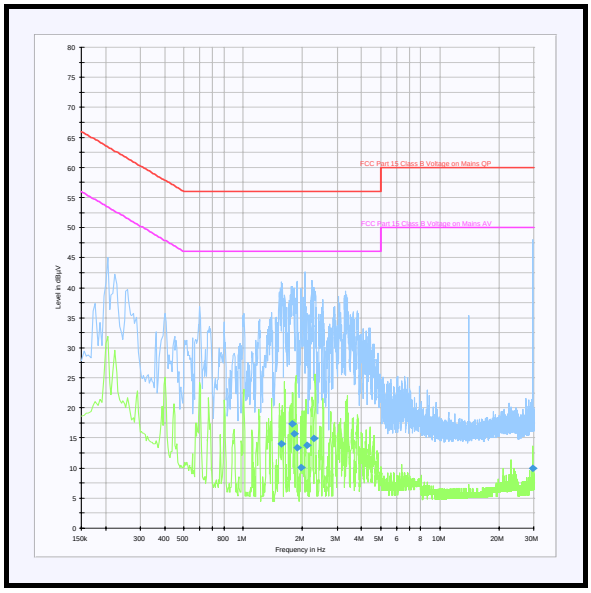
| | |
|---|---|
| **Temperature (°C):** | 21 |
| **Relative Humidity (%):** | 36 |

### Results: Quasi Peak Detector Measurements

| Frequency (MHz) | Line | Quasi Peak Level (dBµV) | Limit (dBµV) | Margin (dB) | Result |
|---|---|---|---|---|---|
| 1.567500 | Live | 14.1 | 56.0 | 42.0 | Complied |
| 1.783500 | Live | 17.4 | 56.0 | 38.6 | Complied |
| 1.824000 | Live | 15.6 | 56.0 | 40.4 | Complied |
| 1.878000 | Live | 13.4 | 56.0 | 42.6 | Complied |
| 1.972500 | Live | 10.1 | 56.0 | 45.9 | Complied |
| 2.098500 | Live | 13.8 | 56.0 | 42.2 | Complied |
| 2.278500 | Live | 14.9 | 56.0 | 41.1 | Complied |
| 29.562000 | Neutral | 10.0 | 60.0 | 50.0 | Complied |

**Note(s):**

1. Average detector measurements were all at least 20 dB below the relevant specification limit.



## 7.4. Receiver/Idle Mode Radiated Spurious Emissions

### Test Summary:

| | |
|---|---|
| **FCC Part:** | 15.109(a), 15.225(d) |
| **Test Method Used:** | As detailed in ANSI C63.4 Section 8 and relevant annexes |
| **Frequency Range:** | 9 kHz to 1000 MHz |

### Environmental Conditions:

| | |
|---|---|
| **Temperature (°C):** | 24 |
| **Relative Humidity (%):** | 26 |

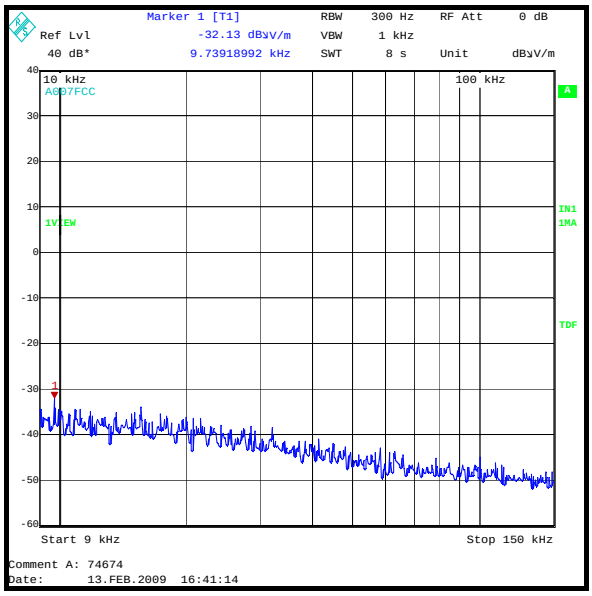
### Results:

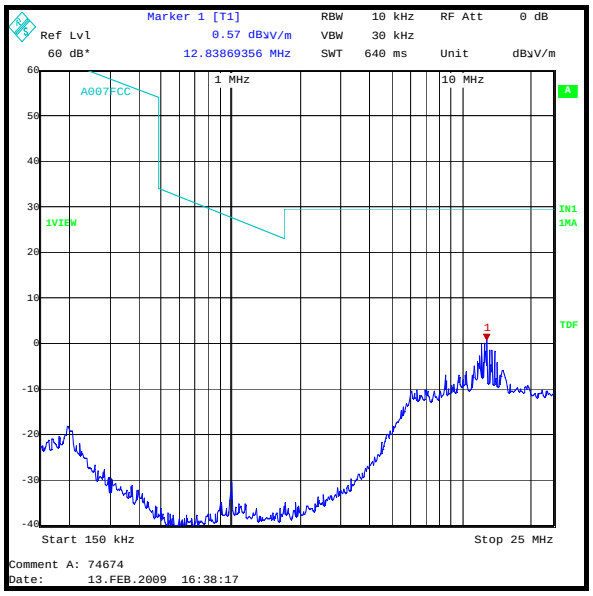
| Frequency (MHz) | Antenna Polarity | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|
| 945.571 | Horizontal | 38.1 | 46.0 | 7.9 | Complied |

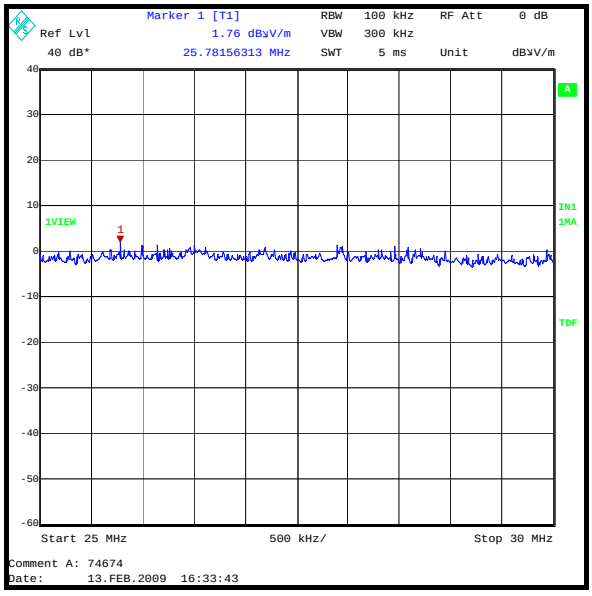
### Note(s):

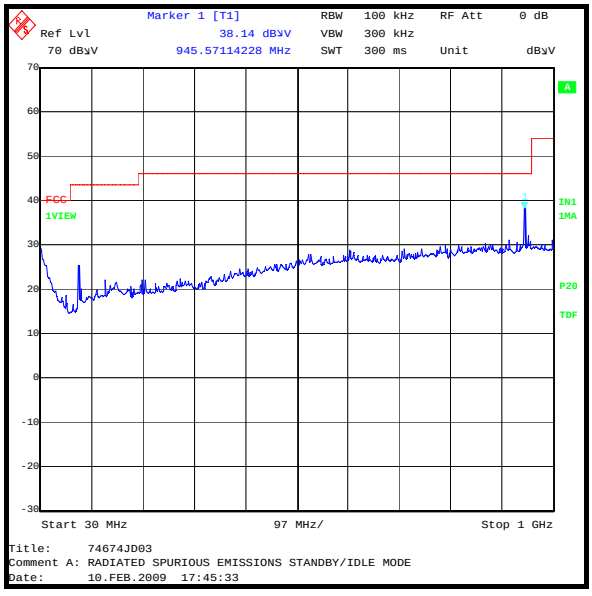
1. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.
3. The emission at approximately 945.571 MHz was investigated and found to be ambient. All other emissions were either ambients or >20 dB below the applicable limit or below the level of the noise floor.

## Receiver/Idle Mode Radiated Spurious Emissions (continued)




*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.*

## 7.5. Transmitter Fundamental Field Strength

### Test Summary:

| | |
|---|---|
| **FCC Part:** | 15.225 (a)(b)(c)(d) |
| **Test Method Used:** | As detailed in ANSI C63.4 Section 8 and relevant annexes |

### Environmental Conditions:

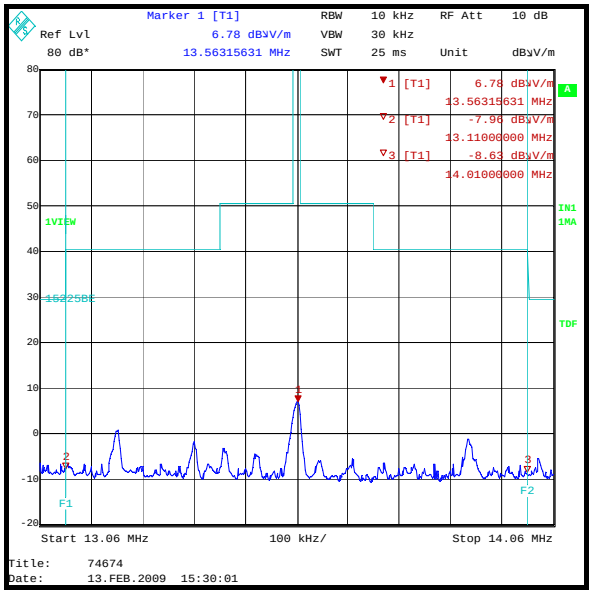
| | |
|---|---|
| **Temperature (°C):** | 23 |
| **Relative Humidity (%):** | 27 |

### Results:

| Frequency (MHz) | Antenna Polarity | Q-P Level (dBµV/m) | Limit at 30 m (dBµV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|
| 13.56 | 90° to EUT | 7.7 | 84.0 | 76.3 | Complied |

### Note(s):

1. Measurements were performed at 3 metres and results extrapolated to 30 metres.
2. The limit is specified at a test distance of 30 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.



## 7.6. Transmitter Radiated Spurious Emissions

### Test Summary:

| | |
|---|---|
| **FCC Part:** | 15.209 (a), 15.225(d) |
| **Test Method Used:** | As detailed in ANSI C63.4 Section 8 and relevant annexes |
| **Frequency Range:** | 9 kHz to 1000 MHz |

### Environmental Conditions:

| | |
|---|---|
| **Temperature (°C):** | 21 |
| **Relative Humidity (%):** | 27 |

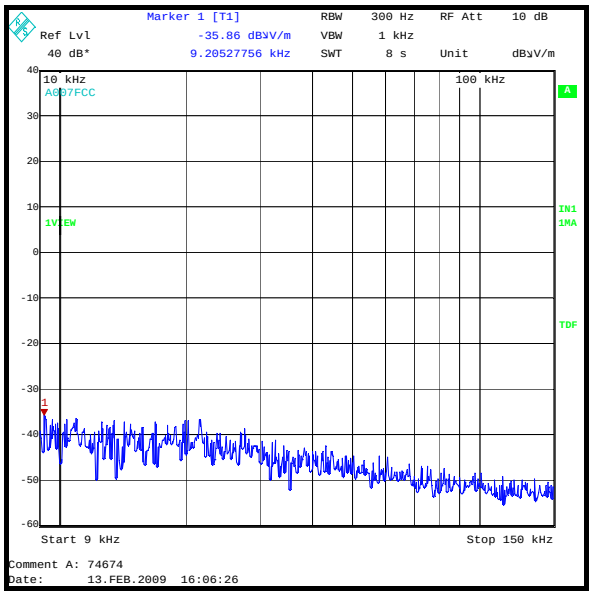
### Results: Electric Field Strength Measurements

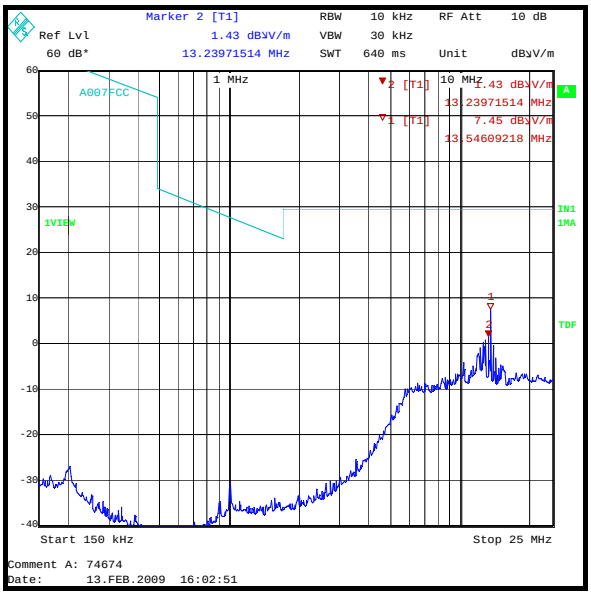
| Frequency (MHz) | Antenna Polarity | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Result |
|---|---|---|---|---|---|
| 230.517 | Horizontal | 43.4 | 46.0 | 2.6 | Complied |
| 420.355 | Horizontal | 34.9 | 46.0 | 11.1 | Complied |
| 433.917 | Vertical | 37.2 | 46.0 | 8.8 | Complied |
| 488.148 | Horizontal | 42.9 | 46.0 | 3.1 | Complied |

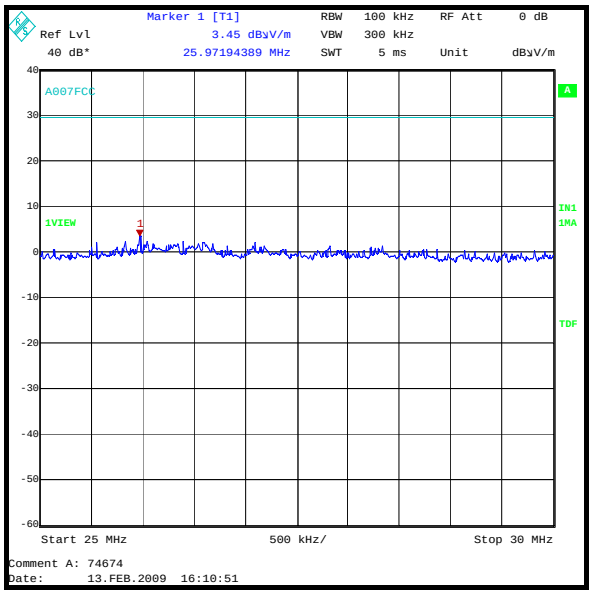
### Note(s):

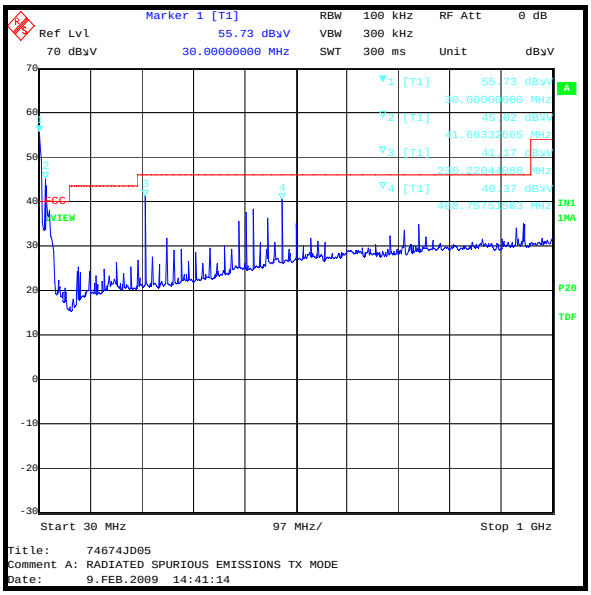
1. Limits below 30 MHz are specified at a test distance of 30 metres, whilst below 0.49 MHz they are specified at a test distance of 300 metres. However, as specified by FCC Section 15.31 (f)(2), measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by making the measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.
3. Emissions at approximately 30 MHz and 41 MHz were investigated and found to be ambients.
4. The emission shown at approximately 13.5 MHz is the fundamental.

## Transmitter Radiated Spurious Emissions (continued)




*Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.*

## 7.7. Transmitter Radiated Emissions at Band Edges

### Test Summary:

| | |
|---|---|
| **FCC Part:** | 15.209(a) 15.225(c)(d) |
| **Test Method Used:** | As detailed in ANSI C63.4 Section 8 and relevant annexes |

### Environmental Conditions:

| | |
|---|---|
| **Temperature (°C):** | 23 |
| **Relative Humidity (%):** | 27 |

### Results: Lower Band Edge

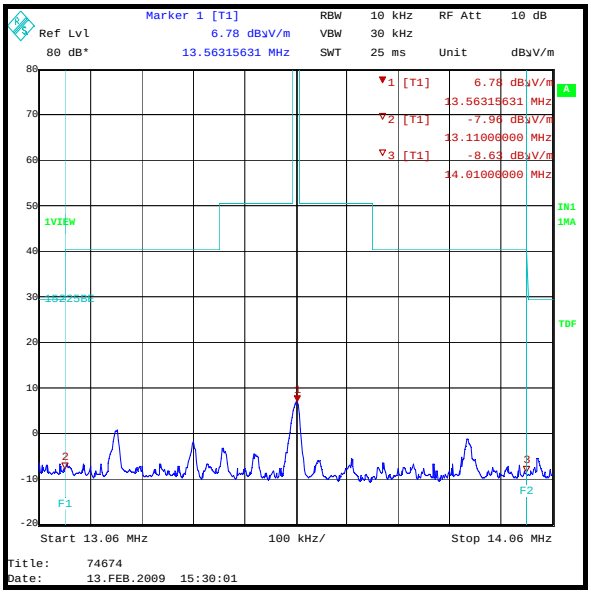
| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Result |
|---|---|---|---|---|
| 13.11 | -8.0 | 40.5 | 48.5 | Complied |

### Results: Upper Band Edge

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Result |
|---|---|---|---|---|
| 14.01 | -8.6 | 40.5 | 49.1 | Complied |

### Note(s):

1. Measurements were performed at 3 metres and results extrapolated to 30 metres.
2. A transducer factor on the measuring instrument was used to extrapolate the results at 3 metres to a distance of 30 metres where required.



## 7.8. Transmitter 20 dB Bandwidth:

### Test Summary:

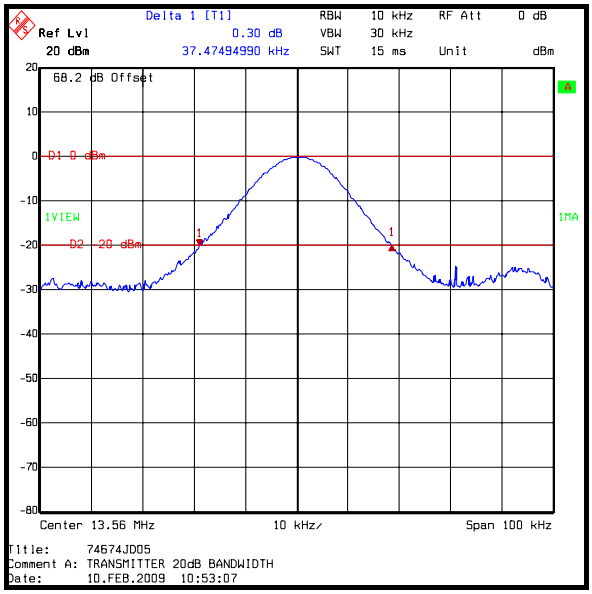
| | |
|---|---|
| **FCC Part:** | 2.1049 |
| **Test Method Used:** | As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes |

### Environmental Conditions:

| | |
|---|---|
| **Temperature (°C):** | 25 |
| **Relative Humidity (%):** | 24 |

### Results:

| Transmitter 20 dB Bandwidth (kHz) |
|---|
| 37.47 |



## 7.9. Transmitter Frequency Stability (Temperature & Voltage Variation)

### Test Summary:

| | |
|---|---|
| **FCC Part:** | 15.225 (e) |
| **Test Method Used:** | As detailed in ANSI C63.4 Section 13.1.6 and relevant annexes |

### Environmental Conditions:

| | |
|---|---|
| **Temperature (°C):** | 22 |
| **Relative Humidity (%):** | 24 |

### Results: Maximum frequency error of the EUT with variations in ambient temperature

| Temp (°C) | Nominal Frequency (MHz) | Measured Frequency (MHz) | Frequency Error (Hz) | Frequency Error (%) | Limit (%) | Margin (%) | Result |
|---|---|---|---|---|---|---|---|
| -20 | 13.56 | 13.559938 | 62 | 0.000457 | 0.01 | 0.000954 | Complied |
| 20 | 13.56 | 13.559970 | 30 | 0.000221 | 0.01 | 0.009779 | Complied |
| 50 | 13.56 | 13.559877 | 123 | 0.000907 | 0.01 | 0.009093 | Complied |

### Results: Maximum frequency error of the EUT with variations in nominal operating voltage at an ambient temperature of 20°C

| Supply Voltage (V) | Nominal Frequency (MHz) | Measured Frequency (MHz) | Frequency Error (Hz) | Frequency Error (%) | Limit (%) | Margin (%) | Result |
|---|---|---|---|---|---|---|---|
| 3.4 | 13.56 | 13.559970 | 30 | 0.000221 | 0.01 | 0.009779 | Complied |
| 3.7 | 13.56 | 13.559970 | 30 | 0.000221 | 0.01 | 0.009779 | Complied |
| 4.2 | 13.56 | 13.559962 | 38 | 0.000280 | 0.01 | 0.009720 | Complied |

## 8. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

| Measurement Type | Range | Confidence Level (%) | Calculated Uncertainty |
|---|---|---|---|
| AC Conducted Spurious Emissions | 0.15 MHz to 30 MHz | 95% | ±3.25 dB |
| Occupied Bandwidth | 13 MHz to 14 MHz | 95% | ±0.12 % |
| Frequency Stability | 13 MHz to 14 MHz | 95% | ±11.37 ppm |
| Radiated Spurious Emissions | 9 kHz to 30 MHz | 95% | ±3.53 dB |
| Radiated Spurious Emissions | 30 MHz to 1000 MHz | 95% | ±2.94 dB |

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

## Appendix 1. Test Equipment Used

| RFI No. | Instrument | Manufacturer | Type No. | Serial No. | Date Last Calibrated | Cal. Interval (Months) |
|---|---|---|---|---|---|---|
| A004 | LISN | Rohde & Schwarz | ESH3-Z5 | 890604/027 | 19 May 2008 | 12 |
| A007 | Antenna | Rohde & Schwarz | HFH2-Z2 | 880458/020 | 28 Feb 2008 | 12 |
| A1299 | Antenna | Schaffner | CBL6143 | 5094 | 28 Jul 2008 | 12 |
| A1830 | Pulse Limiter | Rhode & Schwarz | ESH3-Z2 | 100668 | 05 Jan 2009 | 12 |
| E013 | Environmental Chamber | Sanyo | ATMOS chamber | None | Calibrated before use | - |
| K0001 | 5m RSE chamber | Rainford EMC | N/A | N/A | 13 Aug 2008 | 12 |
| M1068 | Thermometer | Iso-Tech | RS55 | 93102884 | 09 Jul 2008 | 12 |
| M1124 | Spectrum Analyser | Rohde & Schwarz | ESIB26 | 100046K | 19 Feb 2008 | 12 |
| M1242 | Spectrum Analyser | Rohde & Schwarz | FSEM30 | 845986/022 | 09 Dec 2008 | 12 |
| M1269 | Multimeter | Fluke | 179 | 90250210 | 09 Apr 2008 | 12 |
| M127 | Spectrum Analyser | Rohde & Schwarz | FSEB 30 | 842659/016 | 21 Aug 2008 | 12 |
| M1379 | Test Receiver | Rohde & Schwarz | ESIB7 | 100330 | 14 Aug 2008 | 12 |
| S0520 | DC Power Supply Unit | GW instek | GPC-3030 | E835141 | Calibrated before use | - |

**NB** In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.